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ABSTRACT

A survey of recent studies on trends and allocations of resources in the American family structure, supplemented by empirical data on family dynamics, may be a step toward clarifying the issue of which processes of family life consistently contribute to children's performances in school. Whether family characteristics or family use of time and activities are more important to achievement may best be shown through an economic human capital approach to the family-school relationship; such an approach to analyzing data on family structure accurately interprets the contribution of family life to learning. Based on 887 responses to a questionnaire seeking information on family time use and activities, the relative importance of the following six aspects of family characteristics for school achievement was assessed: (1) socioeconomic status, (2) family structure, (3) mother's characteristics and availability, (4) parental attitudes and expectations, (5) use of child's time, and (6) parent/child interactions. Responses were matched to school data on math and reading scales. Results show that for reading: none of the SES variables was significant; among the family structure variables, only the presence of a younger, preschool sibling was significant; mother's education, mother's occupation, and educational expectations were positively associated with achievement; 6 out of the 10 significant variables measured time use or parent/child interactions. For math, all significant variables related to time use and activities. Thus, measured by the economic model of family impacts, differences in the allocation of after-school time may be important factors in student achievement. (JW)

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THE INTERACTION OF FAMILY ENVIRONMENT AND EDUCATIONAL ADMINISTRATION

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THE INTERACTION OF FAMILY ENVIRONMENT AND EDUCATIONAL ADMINISTRATION

Student achievement is considered in the context of national trends in family environment. Competing models of the family-school nexus are contrasted and the implications for educational administration are explored. Findings from a recent study of the relationship of family characteristics, parent-child interactions and after-school time use are presented and evaluated in terms of competing models. Finally, an argument for continued research on the interaction of home and school factors is developed.

There appear to be a number of paradoxes in popular perceptions and research priorities pertaining to public education. First, there is the widely-held belief that schools make little or no difference in determining student achievement. The 1966 finding of Coleman and his colleagues that "the sources of inequality . . . lie first in the home itself" has not been displaced.[1] At the same time, there is a popular perception that successive generations of high school graduates are less well prepared than in the past and that responsibility for this trend should rightfully be placed at the feet of those managing our schools. There is concern that we are not getting 100 billion dollars worth of value for our public expenditure on elementary and secondary education, and the feeling that school administrators are not efficient managers. In fact, there is little solid evidence to indicate that what administrators do makes much difference. In his introduction to the recent Speical Issue on Research and Thought in the Quarterly, Wayne K. Hoy observed that:

> after fifteen years . . . the research on school administrators is generally disjointed, atheoretical, non-cumulative, simplistic, and often trivial. Not only is most research theoretically barren, but it also has little or no practical utility.[2]

This perception seems to be shared by the general public. In the most recent Gallup Poll on education only 2 percent of all respondents indicated that they would give public education an overall grade of A. When asked where they would cut the budget, 71 percent favored reducing the number of administrative personnel.[3] Yet, despite this apparent crisis in public confidence, school boards continue to offer attractive salaries and superintendents report that they actually like their work. If we (the American public) really believe that what administrators do doesn't matter, why do we blame them for the shortcomings of our students? If we really do blame them, why do we pay them so much and why are they so content?

In the area of educational research, family and school are still the key issues and the behavior of researchers is no less paradoxical than that of the general public.

These paradoxes involve where we look, within the school-home dichotomy, and what we look at in each area. First, having established (on the basis of a number of large-scale surveys) that family variables account for most of the explainable variance in achievement, and that school variables account for very little, we have devoted most of our research effort to fishing in the pond with the smaller fish. The obvious explanation here is that, while class size is a policy variable, family size is not. If the objective of research is to inform public policy, the logic of looking at the impact of those things that could be easily manipulated seems sound.

More puzzling is what we look at and what we seem to find in each area. The literature on school effectiveness is voluminous and does not lend itself easily to summary. In a recent paper on resources and school achievement. Richard Rossmiller tentatively described the state of our knowledge on these relationships in the following terms. "Among the variables which do not appear to be closely related to student learning outcomes are the level of spending per pupil, quality of buildings, average school or class size and organizational structure."[4] If I were pressed to summarize analogous findings regarding the family, my conclusions would be strikingly different. In fact, I might say "among the variable which do appear to be closely related to student learning outcomes are the level of family income per pupil, the presence of family possessions, family size and family structure."

Rossmiller goes on to note that "there are some variables which, on the basis of research evidence seem to consistently affect the learning outcomes of students . . . these variables relate more to the way in which resources are used--the process of the school and classroom--than to the level of resources per se."[5] On the family side, very little is known about processes out of school. In fact, while there is a substantial literature on how time is spent in the classroom, "there is surprisingly little written about the things that parents and children actually do together."[6]

As researchers we behave as though there were fundamental differences in how children learn in and out of school. While we have begun to realize that mechanistic models of school-learning are inadequate to identify what it is that make a difference, much of our knowledge of the relationship of home to achievement takes just this form. We still rely on characteristics (such as SES or family size) rather than family processes as predictors of achievement.

Rationale for Family Studies

Assuming, for the moment, that the sole objective of educational research is that of identifying policy variables to improve school efficiency, one might ask why we should bother studying the family-achievement relationship. Even within this applied framework, there are, I believe, four important reasons why research should focus on the family. First, the fundamental process of learning is probably quite similar in both environments. If, as a large number of studies suggest, substantial learning occurs outside of the school, this may be a better environment in which to unravel learning processes. Particularly, since there is more variability in the out-of-school environment than in schools. As Charles Benson has noted, "a more comprehensive approach to studying the out-of-school environment might allow us to design a better integrated and more effective set of policies toward youth."[7] A second reason for such studies is that there are undoubtedly strong interactions between home and school processes. A hallmark of school-based educational research is that findings emerge and disappear, sometimes reversing, depending upon the sample used. We will never really be able to understand what's happening in schools without an understanding of what is happening outside schools. A third reason has to do with assessment. As a sector, is public education doing well? How does district X compare to district Y? If school achievement is largely determined by what occurs outside school, we cannot

assess the effectiveness of schools without "controlling" for the greater environment. In this paper we argue that such control, independent of knowledge of out-of-school process, is not dependable. The fourth reason why such knowledge is essential has to do with formulating public policy. The equity implications of school finance innovations such as tuition tax credits cannot be meaningfully examined independent of out-of-school learning.

These four reasons would be compelling in themselves were the family a stable institution. But, in fact, during the past decade, the family has been one of the most volatile elements in our social system. Much of our present knowledge about schools incorporates statistical "controls" for family factors. Frequently, we have relied upon those family measures that were most readily available. As the family changes, one must question whether the family variables continue to measure the same learning-related family processes as they did in the past. Is the meaning of "mother's education" as it pertains to home learning, independent of labor force participation? What does "father's educations" mean in a female-headed, single-parent family? What does it mean in a "reconstituted" family? In fact, <u>which</u> father's education is more relevant? The lack of solid information on the <u>process</u> by which family characteristics and behaviors affect achievement has always been a major weakness of educational research. Now, as the institution of the family undergoes rapid and substantial change, identifying these processes becomes essential.

In this paper, I briefly review trends in the structure of the American family and what is known about the relationship of family structure to achievement. The paper focuses upon the economic model of time allocation and household production. Within that economic perspective, I present findings from a recent empirical study of the relationship between home activities and achievement in school. Finally, I consider the implications of family research for school administration.

Trends in Family Structure

What a child experiences when not in school (and perhaps in school as well) is, in large part, determined by the structure of his or her family. The American family has changed dramatically during the past decade. Divorce and maternal employment are today more likely than ever before to be factors in a childs experience. The divorce rate has doubled between 1970 and 1980.[8] The probability of a new marriage ending in divorce is now about one in two.[9] The number of "unmarried-couple households" has tripled over the past ten years,[10] perhaps keeping the official divorce rate lower than it might otherwise be. The proportion of children living in one parent homes has increased by 66 percent since 1970 so that one in five children under 18 now lives with one parent. Of course, a cross sectional count understandings the full incidence of living with one parent. Through divorce and remarriage, children move in and out of two family home envircnments. It has been estimated that between 40 and 50 percent of all children born in the 1970s will live in a single parent household at some time.[11] In fact, the rate of remarriage by divorced adults has increased by 113 percent during the decade, thereby increasing the number of children living in "reconstituted" families. In addition to emotional trauma, changes in family structure frequently bring with them dramatic changes in economic status. When marriages dissolve after only a few years, there is frequently little real property to divide and the greater part of family human capital is retained by husbands.[12] In 1971, fewer than half of all divorced women with children could expect to receive court-awarded child support. Over half of those entitled to support, received none.[13]

Even in intact households the nature of parent-child interaction has changed dramatically. In 1980 labor force participation rate for women reached 51.6 percent, up from 37.7 percent in 1960, an increase of 37 percent. For married women, husband

present, who had children under age six, the comparable change over that same period was 141 percent (changing from a participation rate of 18.6 to 44.9). More than ever before, the phenomenon of having a working mother is commonplace for preschool and school-aged children. While the total number of 3 and 4 year olds decreased by 15 percent over the past decade, nursery school enrollments went up. The participation rate has increased from 20 to 30 percent among this age group during that ten year interval.

If we were to compare the out-of-school experience of a typical child today to that of a child the same age years ago, we would observe that today's child is far more likely to have a working mother, to spend some time living with only one parent, and to experience a dramatic change in living standard. In addition to changes in the structure of the family, there have been secular and cyclical changes in the general economy and culture as well, that may affect achievement both directly and through the family. For example, a child today is more likely to have used a computer or video game and, during the past few years, to have had an unemployed father at home. Based on research on the family during the Great Depression of the 1930s, we know that paternal unemployment can adversely affect a child's performance.[14] While some evidence on the television's impact on achievement exists, we know relatively little about the impact of computers and video games. As the world beyond the classroom door changes, it is reasonable to expect student performance to change as well.

Family Structure and Achievement

Assuming 9 hours of sleep per day on average, children have nearly 100,000 waking hours between birth and the completion of high school. Of these, 13,000 (less than 15 percent) are spent in the classroom. While substantial attention has focused on the relation of time on task to outcomes in school, we know relatively little about how these other 85,000 hours are spent and if the way they are used affects achievement. Survey data clearly demonstrate that family characteristics and school achievement are strongly related. Children from advantage homes enter school with more skills than their peers and, attending the same school, differences increase, on average, throughout the school experience. Clearly, substantial educational "production" occurs at home prior to school entry, after school, on weekends, and during summer vacations. In fact, there is substantial evidence that much of the SES-related differences in student achievement is due to differential learning and losses, at home, during the summer vacation.[15] It is likely that the mechanism through which the family influences cognitive and social development is parent-child interaction, particularly during the early years when parents are the predominent influence. Yet, we know relatively little about the nature or extent of such interactions.

The substantial body of survey data on school achievement that has been assembled over the past two decades includes a number of home and family variables, yet analyses of these data contribute little to our understanding of the learning process at home. Data on nonschool activities have been limited in a number of important ways:

> Frequently, researchers are not interested in the effects of family variables per se. Instead, they simply want to control for (them) . . . . Hence, they may show less care in the selection of measurement . . . . They often seize on readily available measures . . . without careful consideration of how they relate theoretically to . . . outcomes.[16]

Expedience and cost factors are not the only limitations; there is no consensus on the theoretical framework most appropriate to examining the family-achievement relationship. For example, Walberg and Marjoribanks identify twelve distinct analytic models from which the influence of family environment on cognitive development might be viewed.[17] In a recent review of literature in this area, Iverson and Walberg synthesize findings from 18 major studies within the framework of four major "schools" which emphasize socioeconomic status, family structure, parental attitudes, and parent-child interactions.[18] Other theorists have observed that, given the pattern of neighborhood schools, family effects may be transmitted indirectly through childrens' peers, teachers' expectations, or even the general neighborhood social ambiance.[19] While developmental psychology provides an extensive literature on parent-child interactions at home, the links to school performance are not clear. Observational studies in the classroom show that children from different socioeconomic backgrounds differ in linguistic style.[20] Studies of preschooler-mother dyads in learning situations indicate that teaching styles differ dramatically with mother's education. Laosa hypothesizes that preferred teaching style may be function of the duration of exposure to schooling and that home and school cognitive style are more similar in households with more educated mothers.[21]

Given this diversity of theoretical models, little in the substantial body of input-output data provides insights into the home learning process.[22] Usually, these studies provide, what Bronfrenbrenner calls "social addresses"--labels for a situation, rather than measures of what a child is actually experiencing.[23] Two of the most prominent such addresses in recent studies have been "single parent" and "working mother." The extensive literature in this area has been the subject of a number of recent reviews.[24] While there is little evidence that maternal employment adversely affects school achievement, it is acknowledged that "the data are very limited. There is in fact no

study that has properly investigated the connection between maternal employment and the child's academic attitudes or cognitive functioning and abilities."[25] One review concludes that "we simply do not know what the effects of maternal employment are."[26]

One approach to studying the family-school relationship is the economic human capital model. At the core of the approach are two related concepts: (1) learning enhances productivity and (2) learning is not costless. In each period, individuals are hypothesized to make decisions about incurring costs in the present to enhance their own productivity in the future. That is, they invest in themselves just as an entrepreneur would invest in capital equipment in expectation of future returns. While human capital investment activities can take a variety of forms (e.g., migration, health care), those activities related to learning have received the most attention. Three learning-related investments are of particular interest. First, and most obvious, individuals invest in themselves by acquiring additional schooling. Attending college, for example, has direct costs in the form of tuition, books and supplies and indirect costs such as wages foregone. Returns take the form of higher earnings and more interesting and enjoyable work. A second form of investment that is quite important in on-the-job training (OJT). While it is difficult to observe learning as it occurs at work, the observed shape of the typical experience-earnings profile suggests that productivity increases substantially over the life cyle. Individuals are thought to self-finance much of this training by accepting lower wages than they would receive if no training were taking place.[27] Learning new skills at work may require the use of resources such as capital equipment, supervisory inputs and supplies; it will inevitably require time inputs on the part of the person learning. Even if learning were cost-free, jobs that included large training components (with higher productivity and wages

in the future) would be sought, low-training jobs would be shunned and the job market itself would serve to shift the "costs" of training to individuals.

A third form of investment in learning may be the investments that parents make in enhancing their children's human capital stock. Clearly, when parents finance a child's college education, this investment perspective makes sense. Similarly, one can view parental payments for private school, preschool or even the costs of moving to a community with better public schools as a form of such investment. While each of these examples involves costs in the form of money allocated to purchase additional or higher quality educational services, there may be comparable costs associated with what parents do directly with children at home.

Household Production and Time Allocation

Building Gary Becker's seminal article "A Theory of the Allocation of Time,[28] economists have focused upon the household as a productive unit. Whereas the traditional model of consumer behavior describes individuals as allocating time between work and leisure and deriving utility directly from market purchased commodities, this new model sees households as the units which produce utility-yielding commodities.[29] Both market-purchased goods and family members' time enter this household production process as inputs. The full cost of home-produced commodities therefore depends on the quantity and unit price of purchased inputs and the amount and "hourly cost" of family members' time. The "cost" of time in household production is an opportunity costs. That is, the value of what the person would be doing in the next best alternative use of his or her time--the opportunity that is foregone.

One of the commodities that may be produced at home is human capital in children. To the extent that such "production" involves costs to the family, it can be

viewed as a form of investment akin to the purchase of educational services.[30] From an investment perspective, determining the "cost" of an hour spent in this way is an important research issue since such activities are highly "time-intensive" and the value of time probably provides a good index of the level of total resources allocated to such investment.

A second conceptual issue related to the household production of human capital in children has to do with the productivity of parental time. Just as increased productivity elsewhere increases the cost of an hour spent with children, we would expect parents to differ in their hourly productivity in teaching at home. In any given hour of parent-child interaction (holding physical inputs and child characteristics constant), the amount of learning that occurs might depend upon two things. First, the parent might be more or less productive as a teacher depending upon innate education and ability. In addition, the same hour, with the same parent, might be more or less productive, depending upon the specific activities undertaken. For example, Leibowitz notes that "time spent reading to a child is probably higher quality time than time spent watching TV together."[31] She distinguishes between differences in productivity that are due to differences in inherent parental characteristics ("worker effect") and those that have to do with the activities that parents select (allocative effect). Additional parental education might, therefore, have several effects. First, by increasing hourly productivity in other activities it would raise the cost of time spent caring for children. It might make the parent a more productive teacher during time spent directly with the child through the "worker effect." Finally, more educated parents might be better managers of children's time through the "allocative effect." It is possible that this last effect might influence, not only the time parent and child spend together but, by directing children to more learning-condusive activities, child's time alone, as well.

Time Use--Costs and Effects

There is a well developed literature on the way adults use time in the United States.[32] The single most powerful set of determinants of women's time-use reflects the presence and ages of children. A number of economists have examined the impact of career interruptions on the subsequent earnings of women.[33]

Information on the way elementary school children spend time is less common. In 1976, a national probability sample of 1700 families was interviewed regarding children's out of school time use.[34] A subsample of these families was reinterviewed in 1981. In 1975, researchers at the University of California, Berkeley interviewed 764 Oakland families concerning time use after school.[35] In both studies information on school achievement was also collected. Aside from these two studies, little data relating time use to educational outcomes exist. As the principal investigators in the Berkeley study note, "children are infrequently the subjects of time research."[36] The limited data that do exist are reviewed in Benson.[37] Given the consistency with which family characteristics are associated with achievement, "there is surprisingly little written about the things that parents and children actually do together."[38]

The few studies that attempt to relate specific activities to outcomes are inconclusive. Looking at the verbal performance of preschoolers, Leibowitz found that outcomes were negatively related to family size and positively related to mother's education.[39] When measures of specific parent-child activities were added to the regression equation, the size of the coefficient on mother's education decreased and was no longer statistically significant. Her findings suggest that it is activities, rather than characteristics which affect achievement.

Benson, Medrich and Buckley, looking at the performance of elementary school children on the California Test of Basic Skills, found that the observed relationship

between five parent-child interactions and achievement diminshed or disappeared when one controlled for family SES. They report that "looking closely at the relationship between these five variables and achievement . . . none indicates a strong independent effect but, on the contrary, . . . a relationship subordinate to SES itself."[40]

The issue of identifying the set of variables that best explains achievement is central to understanding the family-achievement process. Is it birth order, SES and mother's characteristics per se. that directly affect achievement or do children in different situations do different things? Obviously, substantial research and replication will be needed before even tentative answers to such questions emege. Findings from one recent study in this area are briefly described below.

Emprical Analysis

The Data

A ten page questionnaire with items on time use, parent-child interactions, parental attitudes, family structure, work history, and socioeconomic status was sent to the mothers of 1,400 elementary school children in a district in NY State in 1975. Useable information was returned for 887 students and responses were matched to school data on MAT, MATH and READING scales. Data from this effort were used in a series of related studies. Information on parental work experience and earnings was used to estimate the impact of time out of the labor force on the earnings of women in this sample.[41] An extension of that effort focused on the hourly price of time with children.[42] Finally, information on time use and activities were used to assess the relative importance of six aspects of family characteristics and behavior on achievement.[43] Findings from this last study are summarized below.

INSERT TABLE 1 ABOUT HERE

Based on questionnaire responses, thirty six variables, describing family structure and behavior, were organized into six groups as shown in Table 1. The groups were: (1) SES--four variables; (2) Family Structure--six variables; (3) Mother's Characteristics and Availability--six variables; (4) Parental Attitudes and Expectations--two variables, (5) Use of Child's Time--seven variables; and (6) Parent-Child interactions--ten variables. Given the large number of independent variables, the analysis was conducted in two steps. First, the two achievement measures (MAT standardized math and reading scores), were regressed on each of the six sets of independent variables separately, controlling for students grade and sex. This analysis provided a means of comparing the relative explanatory power of variables within each group (columns 3 and 5, Table 1).

Those variables that were not significant at the .10 level were excluded from consideration in the second step of analysis. The first step reduced the number of exogenous family variables from 36 to 19 in the reading equation and to 11 in the math equation. Variables representing each of the six groups were retained in both second step models. Using the inclusion criterion of significance at the .10 level, ten family variables were retained in the READ model and six in the MATH model.

In the final reading model, none of the SES variables was significant. Among the family structure variables, only the presence of a younger, preschool-age sibling was significant. Both mother's education and mother's occupations status were positively associated with achievement as was educational expectations. Six out of the ten variables that were retained measured time use or parent-child interactions. While the direction of associations was surprising on a number of variables (negative coefficient on time spent with adults, doing homework, and eating dinner with

parents), the second step of analysis strongly suggested that what children do, alone and with parents after school, is an important predictor of achievement.

Findings from the final math regression equation were even more dramatic. Only six family variables were retained in the final model and, with the exception of parental expectations, all retained variables related to time use and activities. In other words, once educational expectations and after school activities were controlled for, neither SES, Family Structure, Mother's education, occupational status, labor supply nor past work history appeared to be related to math achievement!

The paper from which these findings are taken describes the data and analyses in detail and includes a number of caveats regarding limitations of the study. Overall, the findings seem to support the economic model of family impacts, and to indicate that differences in the allocation of after-school time may be important factors in understanding the process by which family and achievement are related.

Conclusions and Implications

We began this paper by noting a number of paradoxes in popular perceptions and research priorities. Foremost among these was the observation that at the school level, process variables generally provide insights in explaining achievement differences while measures of characteristics and structure do not. At the family level, we know little about process but find that differences in characteristics and structure explain a great deal. Does the research we reviewed here help to unravel this paradox? I would argue that it does in that it provides a theoretical basis for identifying mechanisms of transfer and for developing hypotheses about family behavior. Moreover, it gives us a sense of what data to collect inorder to capture these effects. Time-use information and dyadic mother-child interactions appear to be of substantial importance.

We also posed four policy questions regarding public education which we believe family-based research will help to address. First, can research on the family provide insights into fundamental learning processed and improve the effectiveness of schools? There are at least two levels at which such research might be used. The first, the most obvious, relates to school policy regarding school-directed home activity. The New York City School District (the largest in the nation) recently implemented a district-wide policy of mandatory homework assignments. Certainly, policy-making in this area would be well served by research on the effects of time allocation at home. At a more fundamental level, one might ask whether some families utilize "teaching technology" that is superior to that now in place in the classroom. Does mother know best? At this time, this second level of question cannot be answered. To the extent that out-of-school research may identify improved technology, researchers should be looking at the family.

The second argument in favor of such research has to do with school-family interactions. Why do some school processes appear to succeed with some children and not with others. Since we have not been very successful in differentiating what works by student characteristics (e.g. sex, race, SES, urbanicity), we should, explore, the possibility of understanding interactions in terms of what children experience in and outside of school. It seems plausible that what happens to children, rather than what they look like, or their father's occupational status, may be a better basis for understanding differences in school effects.

The third question has to do with efficiency and assessment. In price adjusted 1980 dollars, expenditure per student in ADA increased by almost one third between 1970 and 1980.[44] During the same period a number of indices of student performance declined. Are we getting less per dollar spent on education than in the past? Obviously, the question cannot be answered by looking at education alone. Given that

education is very labor-intensive, increases in labor productivty in other sectors raise the cost of producing educational services at school. Perhaps even more important is the fact that parental inputs at home also represent costs and investment in children. If the total cost of education is the value of home and school inputs, looking at school inputs alone may be misleading. As expenditure per pupil went up by 30 percent at school, what has been happening at home? The question is not easily answered but, clearly, increased labor force participation by mothers with children suggests a substantial reduction in the dollar value of these home inputs. In a study of the hourly cost of home inputs (based upon the data described above), Levine found that a change of just 30 minutes per day in parental time allocated to children would exceed the total value of school expenditure.[45]

In assessing the performance of schools or districts relative to one another, knowledge of what happens at home may also be critical. Despite the recent movement toward competency-based graduation and promotion standards, school performance is generally assessed conditional upon the family characteristics of the students enrolled. That is, we compare observed performance to a "prediction" based on what we know about family circumstances of the student body. Clearly, better models of how the family effects achievement and better measures of the appropriate "control" variables would greatly improve this assessment process.

Finally, there is the issue of public policy and equality of educational opportunity. If the total package of educational resources that a child receives is the sum of home and school inputs, Allen Thomas is correct in asserting that "a commitment to equal opportunity implies . . . an attempt to utilize schools . . . in reducing home based inequalities."[46] Inorder to understand how reforms such as tuition tax credits may affect the distribution of educational resources, we must first understand what that distribution really is.

Our current knowledge of the impact of school administration on achievement is quite limited. Clearly the most powerful set of forces determining outcomes reside outside the school and outside the school administrator's direct control. If administrators are to maximize effectiveness of schooling, they must use school to redirect the larger external forces of family and neighborhood. Such leverage is unattainable without an understanding of the processes by which family structure and school administration interact.

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Table 1

Reading and Math Achievement Regressions

Group and Variable	Mean	Std. Dev.	Reading Regressions Step 1	Reading Regressions Step 2	Math Regressions Step 1	Math Regressions Step 2
Socioeconomic Status - Group 1						
FAMINC - Family Income 1975 dollars	33,835	15,210	ns(+)		ns (+)	
HDEDUC - Father's education - years	13.60	2.16	1.12**	ns(-)	1.24***	ns(-)
HDOCC - father's occ status (0-9)	7.21	1.63	1.48**	ns (+)	ns (+)	
HDWAGE - father's hourly wage 1975 $	13.18	8.40	ns (+)		ns (+)	
Family Structure - Group 2						
NCHILDREN - # children in family	2.88	1.32	ns (-)		ns (-)	
NPRESCHOOL - # preschoolers	.32	.56	4.19***	3.39***	2.74**	ns (+)
NINSCHOOL - # children in school	2.41	1.20	ns (-)		ns (-)	
NO FATHER - dummy, no father = 1	.09	.29	-3.70*	ns (-)	ns (-)	
JEWISH - dummy, Jewish = 1	.31	.46	3.71**	ns (+)	3.63***	ns (-)
CATHOLIC - dummy, Catholic = 1	.38	.49	-4.71***	ns (-)	ns (-)	
Mother's Characteristics - Group 3						
WFEDUC - mother's education, years	14.88	2.10	2.31***	.82*	1.80***	ns (+)
WFOCC - mother's occ. status (0-9)	5.51	2.76	.85***	.68***	ns (+)	
WFTEACH- dummy, mother teacher = 1	0.01	.10	ns (-)		ns (+)	
WFWAGE - mother's hourly wage 1975 $	7.44	6.55	ns (+)		ns (+)	
WWORK - dummy, mother work 1975 = 1	.42	.49	-2.52*	ns (-)	ns (+)	
PREHOURS - mother's preschool work hrs (000)	.80	2.18	ns (+)		ns (-)	
Attitutdes and Expectations - Group 4						
CEDEXP - education expectations - years	16.03	1.20	4.88***	3.31***	3.81***	3.37***
CEDASP - educational aspirations - years	16.04	.98	ns (+)		ns (+)	
Time Use After School - Group 5						
TV - television watching - hrs	1.33	.74	-2.80***	ns (-)	-2.96***	-2.22**
ADULTS - time with adults - hrs	1.23	.73	-2.31**	-1.72*	-2.50***	-2.42***
ALONE - time playing alone - hrs	.74	.63	2.75**	ns (+)	1.83**	ns (+)
CHILDREN - time with other children	2.29	.86	ns (-)		ns (+)	
HOMEWORK - time doing homework	.63	.58	-3.56**	-3.22**	ns (-)	
ORG ACTIVITIES - time in organized activities	.24	.65	ns (-)		ns (-)	
CHORES - time doing chores	.03	.17	ns (+)		ns (-)	
Activities - Group 6						
READPAST - dummy, read to every day preschooler	.54	.50	7.39***	3.05**	4.96***	2.37*
EATWITH - dummy, eats dinner with adults = 1	.86	.35	-4.93***	-3.21*	-6.64***	-6.20***
READNOW - mom & kid read books together = 1	.67	.47	ns (-)		ns (-)	
GAMES - mom & kid play games together = 1	.59	.49	-3.42***	ns (-)	ns (-)	
CHORES - mom & kid do chores together = 1	.87	.34	ns (+)		ns (-)	
SHOP - mom & kid shop together = 1	.71	.45	-4.29***	-3.58***	ns (-)	
RECREA- mom & kid do recreational activities=1	.80	.40	ns (+)		ns (-)	
RELIGN - mom & kid engage in religious act. = 1	.08	.27	ns (-)		-4.00*	-4.65**
MUSART - mom & kid engage cultural activities=1	.10	.29	ns (-)		ns (-)	
VBLINT - mom & kid talking or joking = 1	.16	.37	3.19***	4.84***	ns (+)	
Student Characteristics						
FEMALE[a]	.47	.50		4.42***		2.39**
GRADE[b]						
N				443		442
Adjusted R^2				.62		.68

Notes: Only those variables that were significant at the 0.10 level in the first step of analysis were retained in the second step equations. Significance levels: (*** < .01, ** < .05, * < .10, ns = not significant.

[a] Dummy variable FEMALE was entered in each of the six step 1 equations, coefficient was always positive but not always significantly different from zero.

[b] Set of four dummy GRADE variables entered in all step one equations and both step two equations. Coefficients on all variables significant at the .01 level, achievement monotonically related to grade.

Source: V. Levine, Time allocation at home and achievement in school. Paper presented at annual meeting of the American Educational Research Association, Montreal, Canada, April 12, 1983, Tables 1 - 3.

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